

Claims

I claim:

1 1.-A compass system to indicate direction faced comprising:

2 a waterproof housing;

3 a mounting mechanism on said housing to engage a part of a

4 headgear worn by an operator and position said housing in a

5 portion of the forward field of view of the operator;

6 a two-axis gimbal mechanism inside said waterproof housing, said

7 two-axis gimbal mechanism having a protective housing

8 connected to said waterproof housing, said protective

9 housing containing ring structure and two orthogonal axis

10 structures;

11 a magnetic field sensor module mounted on one of said axis

12 structures, said magnetic field sensor module providing

13 magnetic field data signals representative of the direction

14 faced by the operator; and

15 an optical element having a wide field of view to transmit

16 compass

17 data images representative of said magnetic field data

18 signals to the eyes of the operator.

1 2.-The compass system of claim 1 wherein said mounting mechanism

2 transmits horizontal yawing motions of the operator to said gimbal

3 mechanism and said magnetic field sensor module.

1 3.-The modular platform of claim 2 further comprising:

2 a processor electronics module connected to said magnetic field
3 sensor module to receive said magnetic field data signals,
4 said processor electronics module reading said magnetic
5 field data signals and creating representative driving
6 signals; and
7 a microdisplay connected to said processor electronics module for
8 displaying said driving signals.

1 4.-The compass system of claim 3 further comprising:
2 a display light inside of said waterproof housing radiating
3 light through said microdisplay, said optical element being
4 aligned to receive illumination from said microdisplay and
5 transmit said compass data images for viewing by the
6 operator.

1 5.-The compass system of claim 4 wherein said display light can
2 radiate
3 light onto said microdisplay and transmit said compass data images for
4 viewing by the operator.

1 6.-The compass system of claim 5 further comprising:
2 an optically clear shim on said optical element next to a view
3 port on said headgear to prevent obscuration from the
4 environment from blocking the optical path of said compass
5 data images.

1 7.-The compass system of claim 6 further comprising:

2 a battery for supplying electrical power in said waterproof
3 housing; and

4 a switch in said protective housing having a push-button
5 extending

6 through said waterproof housing, said push button connecting
7 said processor electronics module to said battery to turn-on
8 said compass system.

1 8.-The compass system of claim 7 wherein light intensity of said
2 display light and said compass data image can be adjusted by pushing
3 said push button of said switch in a predetermined sequence.

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1 9.-The compass system of claim 8 wherein said magnetic field sensor
2 module is calibrated to account for local, static, magnetic field
3 variations by inputting sequences to said processor electronics module
4 via said push button of said switch.

1 10.-The compass system of claim 9 wherein said push button of said
2 switch can turn off said processor electronics module after a period
3 of time when no significant motion of magnetic field sensor module is
4 determined.

1 11-The compass system of claim 10 further comprising:

2 a counterweight connected to the bottom of said magnetic field
3 sensor module; and
4 a fluid filling said protective housing around said magnetic
5 field sensor module.

1 12.-The compass system of claim 11 wherein said counterweight hangs on
2 rigid attachment from said magnetic field sensor module to help keep
3 it level and prevent oscillations by the operator's pitching and
4 rolling motions, and said fluid dampens movement of said magnetic
5 field sensor module to allow the operator a wide range of pitch and
6 roll motion without degrading the accuracy of said magnetic field
7 sensor module.

1 13.-A head mounted compass system comprising:
2 means for providing a waterproof housing;
3 means for engaging a headgear worn by an operator, said engaging
4 means being mounted on said waterproof housing providing
5 means to hold said housing in a portion of the forward field
6 of view of the operator;
7 means for securing a two-axis gimbal mechanism inside said
8 waterproof housing providing means, said two-axis gimbal
9 mechanism creating means having a protective housing
10 connected to said waterproof housing providing means, said
11 protective housing containing ring structure and two
12 orthogonal axis structures;

1 a means for sensing magnetic fields mounted on one of said axis
2 structures, said magnetic field sensing means providing
3 magnetic field data signals representative of the direction
4 faced by the operator; and
5 means for transmitting compass data images representative of said
6 magnetic field data signals to the eyes of the operator,
7 said transmitting means having a wide field of view to
8 transmit said compass data images.

1 14.-The compass system of claim 13 wherein said protective housing is
2 connected to said waterproof housing providing means and said
3 waterproof housing providing means is coupled to said headgear by said
4 engaging means to transmit horizontal yawing motions of the operator
5 to said two-axis gimbal mechanism creating means and said magnetic
6 field sensing means.

1 15.-A method of sensing direction faced by an operator comprising the
2 steps of:

3 providing a waterproof housing;

4 engaging a headgear worn by an operator by a mounting mechanism
5 on

6 said waterproof housing to position said housing in a
7 portion of the forward field of view of the operator;

8 securing a two-axis gimbal mechanism inside said waterproof

9 housing, said two-axis gimbal mechanism having a protective

10 housing connected to said waterproof housing, said

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1 protective housing containing ring structure and two
2 orthogonal axis structures;
3 sensing magnetic fields representative of the direction faced by
4 the operator by a magnetic field sensor module mounted on
5 one of said axis structures, said magnetic field sensor
6 module providing magnetic field data signals representative
7 of the direction faced by the operator; and
8 transmitting compass data images representative of said magnetic
9 field data signals to the eyes of the operator, said compass
10 data images being over a wide field of view.

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